

WHAT IS CLAIMED IS:

1. A system for recovering primary channel operation in a
2 facsimile receiver, comprising:

3 a signal receiver that receives a signal containing first and
4 second points located at first and second angles; and

5 angle determination circuitry that determines an offset angle
6 by which said signal has been rotated based on said first and
7 second angles.

2. The system as recited in Claim 1 wherein about 90°
separate said first and second angles.

3. The system as recited in Claim 1 wherein said signal
conforms to International Telecommunications Union Recommendation
V.34.

4. The system as recited in Claim 1 wherein said angle
2 determination circuitry causes said offset angle to equal said
3 first angle when at least 180° separate said first and second
4 angles.

5. The system as recited in Claim 1 wherein said angle
2 determination circuitry causes said offset angle to equal said
3 second angle when fewer than 180° separate said first and second
4 angles.

6. The system as recited in Claim 1 wherein said signal is
2 an S signal.

7. The system as recited in Claim 1 wherein said angle
2 determination circuitry refines said offset angle based on a
3 subsequent signal.

8. A method of recovering primary channel operation in a
2 facsimile receiver, comprising:

3 examining first and second angles of first and second points
4 of a signal; and

5 determining an offset angle by which said signal has been
6 rotated based on said first and second angles.

9. The method as recited in Claim 8 wherein about 90°
2 separate said first and second angles.

10. The method as recited in Claim 8 wherein said signal
2 conforms to International Telecommunications Union Recommendation
3 V.34.

11. The method as recited in Claim 8 wherein said determining
2 comprises causing said offset angle to equal said first angle when
3 at least 180° separate said first and second angles.

12. The method as recited in Claim 8 wherein said determining
2 comprises causing said offset angle to equal said second angle when
3 fewer than 180° separate said first and second angles.

13. The method as recited in Claim 8 wherein said signal is
2 an S signal.

14. The method as recited in Claim 8 further comprising
2 refining said offset angle based on a subsequent signal.

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15. A facsimile machine, comprising:

2 image formation circuitry;

3 telecommunications circuitry, including a facsimile receiver,

4 coupled to said image formation circuitry; and

5 a system, associated with said facsimile receiver, for
6 recovering primary channel operation, including:

7 a signal receiver that receives a signal containing first
8 and second points located at first and second angles, and

9 angle determination circuitry that determines an offset
10 angle by which said signal has been rotated based on said
11 first and second angles.

16. The facsimile machine as recited in Claim 15 wherein
about 90° separate said first and second angles.

17. The facsimile machine as recited in Claim 15 wherein said
2 signal conforms to International Telecommunications Union
3 Recommendation V.34.

18. The facsimile machine as recited in Claim 15 wherein said
2 angle determination circuitry causes said offset angle to equal
3 said first angle when at least 180° separate said first and second
4 angles.

19. The facsimile machine as recited in Claim 15 wherein said
2 angle determination circuitry causes said offset angle to equal
3 said second angle when fewer than 180° separate said first and
4 second angles.

20. The facsimile machine as recited in Claim 15 wherein said
2 signal is an S signal.

21. The facsimile machine as recited in Claim 15 wherein said
angle determination circuitry refines said offset angle based on a
subsequent signal.

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22. An apparatus that determines the difference between a
2 received constellation of signals and an expected constellation of
3 signals, comprising:

4 a signal receiver that receives a constellation of signals
5 containing first and second points located at first and second
6 angles, respectively; and

7 angle determination circuitry that determines an offset angle
8 by which the first and second points have been rotated from an
9 expected constellation of signals, wherein the angle determination
10 circuitry determines the offset angle based upon the first and
11 second angles.

23. The apparatus as recited in Claim 22 wherein about 90°
separate said first and second angles.

24. The apparatus as recited in Claim 22 wherein said signal
2 conforms to International Telecommunications Union Recommendation
3 V.34.

25. The apparatus as recited in Claim 22 wherein said angle
2 determination circuitry causes said offset angle to equal said
3 first angle when at least 180° separate said first and second
4 angles.

26. The apparatus as recited in Claim 22 wherein said angle
2 determination circuitry causes said offset angle to equal said
3 second angle when fewer than 180° separate said first and second
4 angles.

27. The apparatus as recited in Claim 22 wherein said signal
2 is an S signal.

28. The apparatus as recited in Claim 22 wherein said angle
2 determination circuitry refines said offset angle based on a
3 subsequent signal.

29. The apparatus as recited in Claim 22 wherein the angle
2 determination circuitry updates an equalizer in the signal receiver
3 as a function of the determined offset angle.

30. The apparatus as recited in Claim 22 wherein the angle
2 determination circuitry updates an equalizer applied to incoming
3 data signals based upon the offset angle between the incoming data
4 signals and a set of training signals.